

### **ABSTRACT**

The change in tissue impedance due to the change in the extracellular matrix that results from the degradation of cartilage is utilized to detect degradation of articular cartilage. A probe comprising electrodes is applied to the articular cartilage which results in a current distribution and electric field within the cartilage, along with an associated voltage drop across the electrodes. The amplitude of this voltage drop is then measured and divided by the current applied to determine the tissue impedance. By measuring the impedance of patient tissue and comparing the detected patient impedance to a normal value for the tissue from clinically normal tissue, a determination of whether the patient tissue is degraded and the extent of degradation is possible. Preferably, the impedance is measured using a probe with interdigitated electrodes. By changing which electrodes are utilized, the wavelength of the current distribution changes, allowing the probe to image depth dependent focal lesions.